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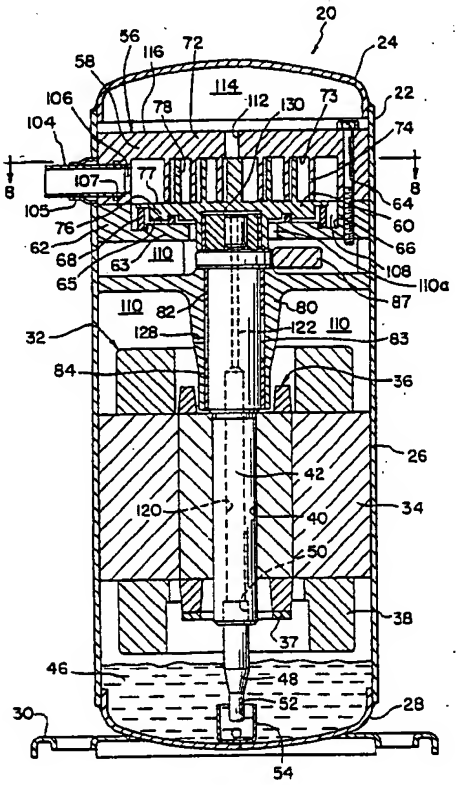
(54) Titre : BAGUE STABILISATRICE AVEC FONCTION DE DEGAGEMENT POUR COMPRESSEUR A SPIRALES

(54) Title: STABILIZATION RING AND SEAL CLEARANCE FOR A SCROLL COMPRESSOR



(57) Abr´g´/Abstract:
An axial compliance mechanism for a scroll-type compressor including a fixed scroll member, an orbiting scroll member and a bearing pad spatially fixed in relationship to the fixed scroll member. The axial compliance mechanism biases the orbiting scroll towards the fixed scroll by applying a fluid at high pressure to a radially inner portion of the back surface of the orbiting scroll member and a relatively lower pressure to a radially outer portion of the back surface. An annular stabilization ring is placed between a main bearing pad and the rear surface of the orbiting scroll lifting the orbiting scroll into engagement with the fixed

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(57) Abrégé(suite)/Abstract(continued):
scroll and inhibiting the tilting and wobbling of the orbiting scroll. The annular stabilization ring also maintains a clearance between the rear surface of the orbiting scroll and the main bearing pad thereby improving the performance of a sealing member disposed between the main bearing pad and the rear surface of the orbiting scroll member during start up of the compressor. The annular stabilization ring lifting the scroll member into engagement with the fixed scroll may be located in a shoulder at the outer periphery of the orbiting scroll member or it may form the annular portion of an Oldham ring which controls the orbiting motion of the orbiting scroll member.

ABSTRACT OF THE DISCLOSURE

An axial compliance mechanism for a scroll-type compressor including a fixed scroll member, an orbiting scroll member and a bearing pad spatially fixed in relationship to the fixed scroll member. The axial compliance mechanism biases the orbiting scroll towards the fixed scroll by applying a fluid at high pressure to a radially inner portion of the back surface of the orbiting scroll member and a relatively lower pressure to a radially outer portion of the back surface. An annular stabilization ring is placed between a main bearing pad and the rear surface of the orbiting scroll lifting the orbiting scroll into engagement with the fixed scroll and inhibiting the tilting and wobbling of the orbiting scroll. The annular stabilization ring also maintains a clearance between the rear surface of the orbiting scroll and the main bearing pad thereby improving the performance of a sealing member disposed between the main bearing pad and the rear surface of the orbiting scroll member during start up of the compressor. The annular stabilization ring lifting the scroll member into engagement with the fixed scroll may be located in a shoulder at the outer periphery of the orbiting scroll member or it may form the annular portion of an Oldham ring which controls the orbiting motion of the orbiting scroll member.

WHAT IS CLAIMED IS:

1. An axial compliance mechanism for a scroll compressor, said axial compliance mechanism comprising:

a fixed scroll member having a fixed plate portion and an involute fixed wrap element;

an orbiting scroll member having an orbiting plate portion with a first orbiting surface and a second orbiting surface, said second surface being disposed opposite said first surface and substantially parallel to said first surface, said first orbiting surface having an involute orbiting wrap element extending therefrom, said orbiting wrap element being intermeshed with said fixed wrap element;

a bearing pad spatially fixed in relationship to said fixed scroll member and having a sealing surface adjacently spaced from said second orbiting surface;

a seal means disposed between said second orbiting surface and said sealing surface, said seal means sealingly separating a radially inward region containing a first fluid contacting said second surface and a radially outward region containing a second fluid contacting said second surface; and

an annular stabilization ring disposed between said bearing pad and said second orbiting surface, said annular stabilization ring in engaging contact with said bearing pad and said second orbiting surface, axial separation of said orbiting and fixed scroll members inhibited by said annular stabilization ring, a clearance between said second orbiting surface and said sealing surface maintained by said annular stabilization ring.

2. The axial compliance mechanism of claim 1 wherein said annular stabilization ring is disposed radially outward of said seal means.

3. The axial compliance mechanism of claim 2 wherein said second orbiting surface includes a recess forming a shoulder at an outer periphery of said orbiting plate portion and said annular stabilization ring is partially disposed within said recess.

4. The axial compliance mechanism of claim 1 wherein said second orbiting surface further comprises an annular groove and said seal means comprises

an annular seal partially disposed within said groove.

5. The axial compliance mechanism of claim 4 wherein said first fluid has a higher pressure than said second fluid.

6. The axial compliance mechanism of claim 4 wherein a sum of said clearance and a depth of said groove is greater than a thickness of said seal means whereby said clearance provided by said annular stabilization ring prevents said orbiting scroll member from bearing on said annular seal.

7. The axial compliance mechanism of claim 1 wherein said bearing pad has a bearing surface for engaging said annular stabilization ring, said bearing surface is parallel to said sealing surface and is disposed at a greater distance from said second orbiting surface than said sealing surface.

8. The axial compliance mechanism of claim 1 wherein said annular stabilization ring further comprises a plurality of projecting keys; said second orbiting surface further comprises a slot for receiving at least one of said projecting keys; and said bearing pad further comprises a slot for receiving at least one of said projecting keys whereby rotation of said orbiting scroll member relative to said fixed scroll member is inhibited.

9. The axial compliance mechanism of claim 8 wherein said annular stabilization ring is disposed radially outward of said seal means.

10. The axial compliance mechanism of claim 8 wherein said second orbiting surface further comprises an annular groove and said seal means comprises an annular seal partially disposed within said groove.

11. The axial compliance mechanism of claim 10 wherein said first fluid has a higher pressure than said second fluid.

12. The axial compliance mechanism of claim 10 wherein a sum of said clearance and a depth of said groove is greater than a thickness of said seal means

whereby said clearance provided by said annular stabilization ring prevents said orbiting scroll member from bearing on said annular seal.

13. The axial compliance mechanism of claim 8 wherein said bearing pad has a bearing surface for engaging said annular stabilization ring, said bearing surface is parallel to said sealing surface and is disposed at a greater distance from said second orbiting surface than said sealing surface.

14. The axial compliance mechanism of claim 1 wherein said annular stabilization ring further comprises anti-rotation means for preventing rotation of said orbiting scroll member relative to said fixed scroll member.

15. An axial compliance mechanism for a scroll compressor, said axial compliance mechanism comprising:

a fixed scroll member having a fixed plate portion and an involute fixed wrap element;

an orbiting scroll member having an orbiting plate portion with a first orbiting surface and a second orbiting surface, said second surface being disposed opposite said first surface and substantially parallel to said first surface, said first orbiting surface having an involute orbiting wrap element extending therefrom, said orbiting wrap element being intermeshed with said fixed wrap element;

a bearing pad spatially fixed in relationship to said fixed scroll member and having a sealing surface disposed adjacent said second orbiting surface;

a seal means disposed between said second orbiting surface and said sealing surface, said seal means sealingly separating a radially inward region containing a first fluid contacting said second surface and a radially outward region containing a second fluid contacting said second surface; and

a sliding member having a controlled thickness, said sliding member disposed between said bearing pad and said second orbiting surface, said sliding member in engaging contact with said bearing pad and said second orbiting surface, axial separation of said orbiting and fixed scroll members inhibited by said sliding member, a clearance between said second orbiting surface and said sealing surface maintained by said sliding member.

16. The axial compliance mechanism of claim 15 wherein said sliding member has a substantially circular shape.

17. The axial compliance mechanism of claim 15 wherein said sliding member is disposed near an outer periphery of said orbiting member and radially outwardly of said seal means.

18. The axial compliance mechanism of claim 15 wherein said second orbiting surface further comprises an annular groove and said seal means comprises an annular seal partially disposed within said groove.

19. The axial compliance mechanism of claim 15 wherein said sliding member further comprises anti-rotation means for preventing rotation of said orbiting scroll member relative to said fixed scroll member.

20. The axial compliance mechanism of claim 15 wherein said sliding member further comprises a plurality of projecting keys; said second orbiting surface further comprises a slot for receiving at least one of said projecting keys; and said bearing pad further comprises a slot for receiving at least one of said projecting keys whereby rotation of said orbiting scroll member relative to said fixed scroll member is inhibited.

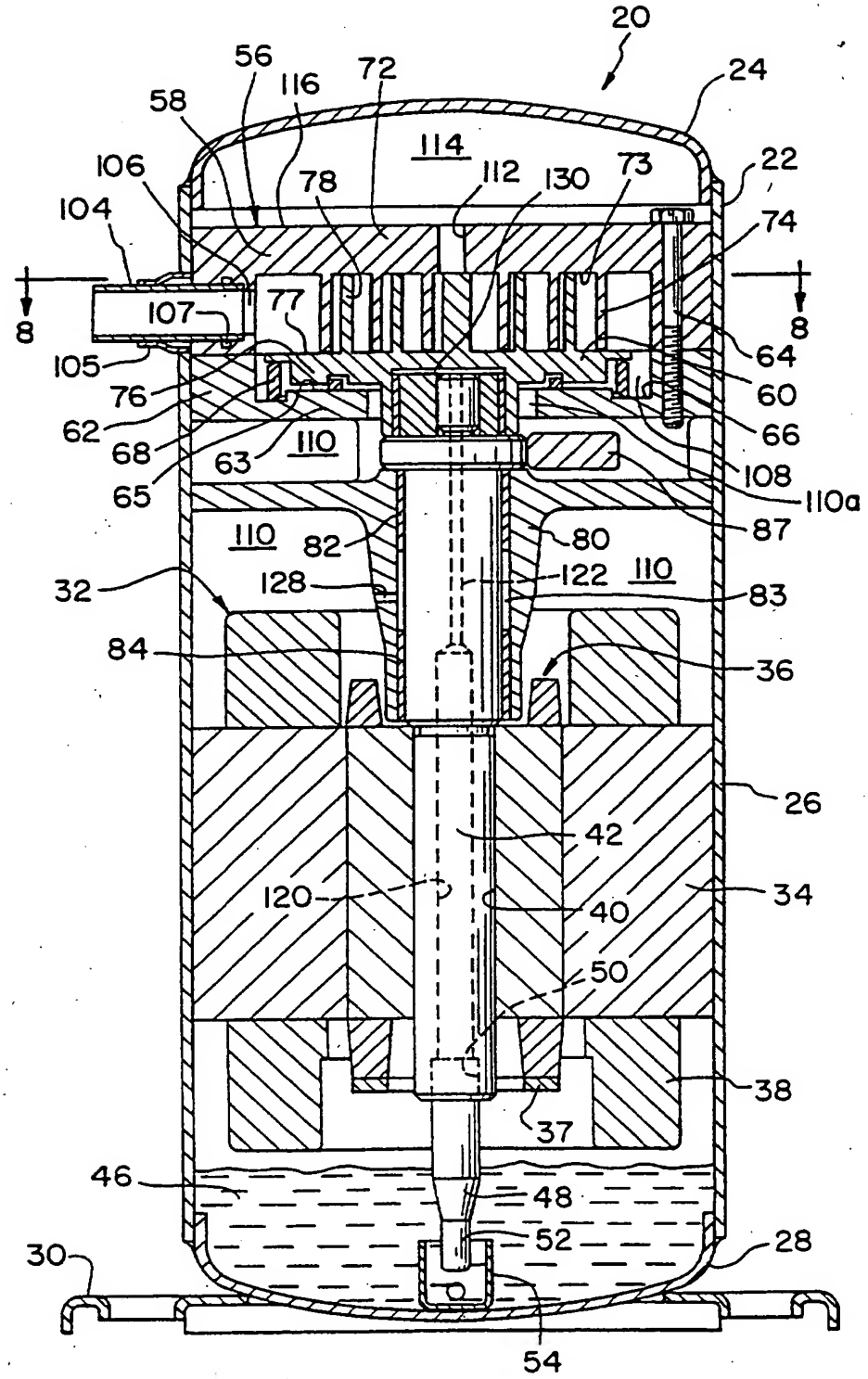
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FIG. 1

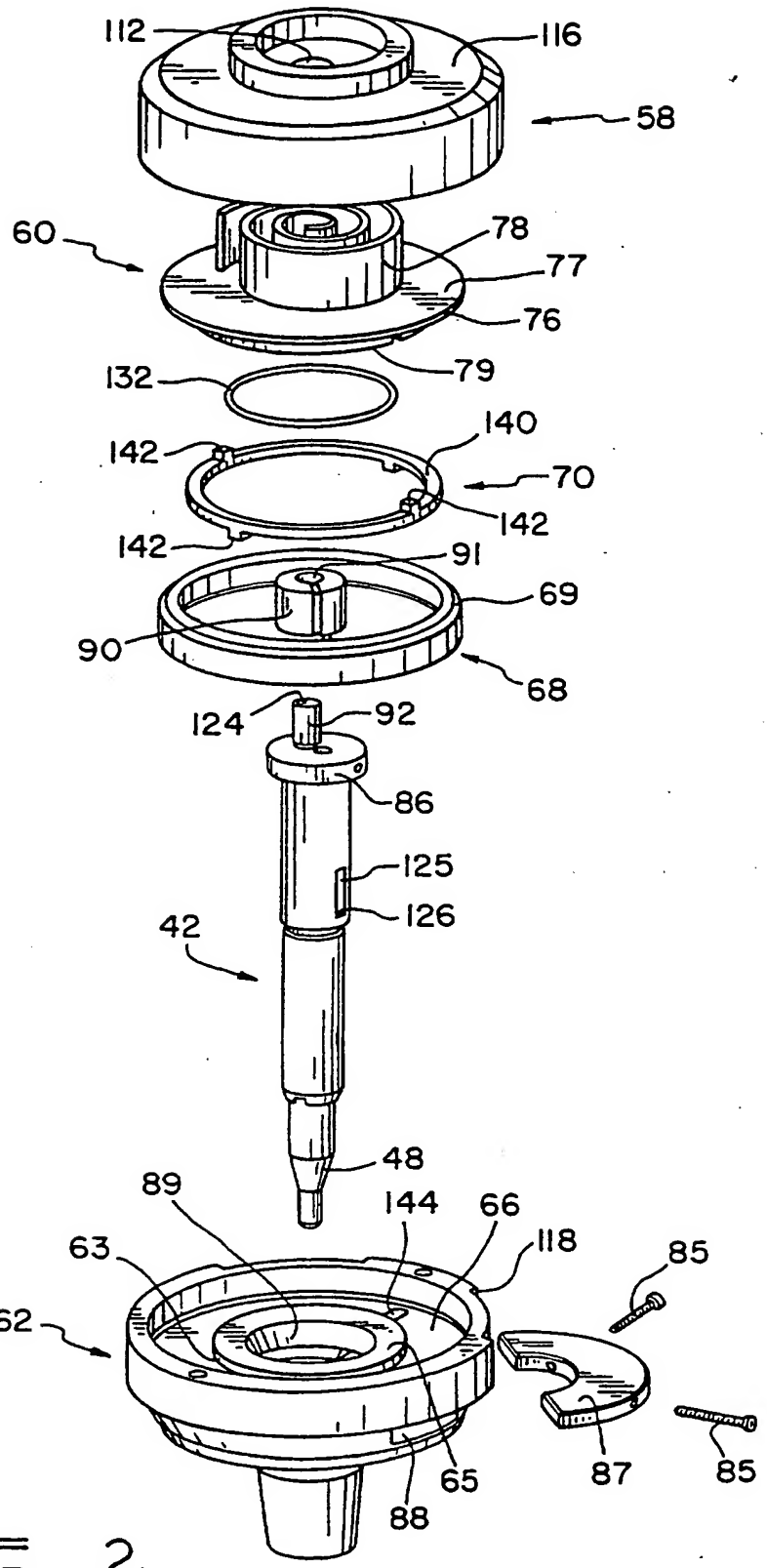
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FIG. 2

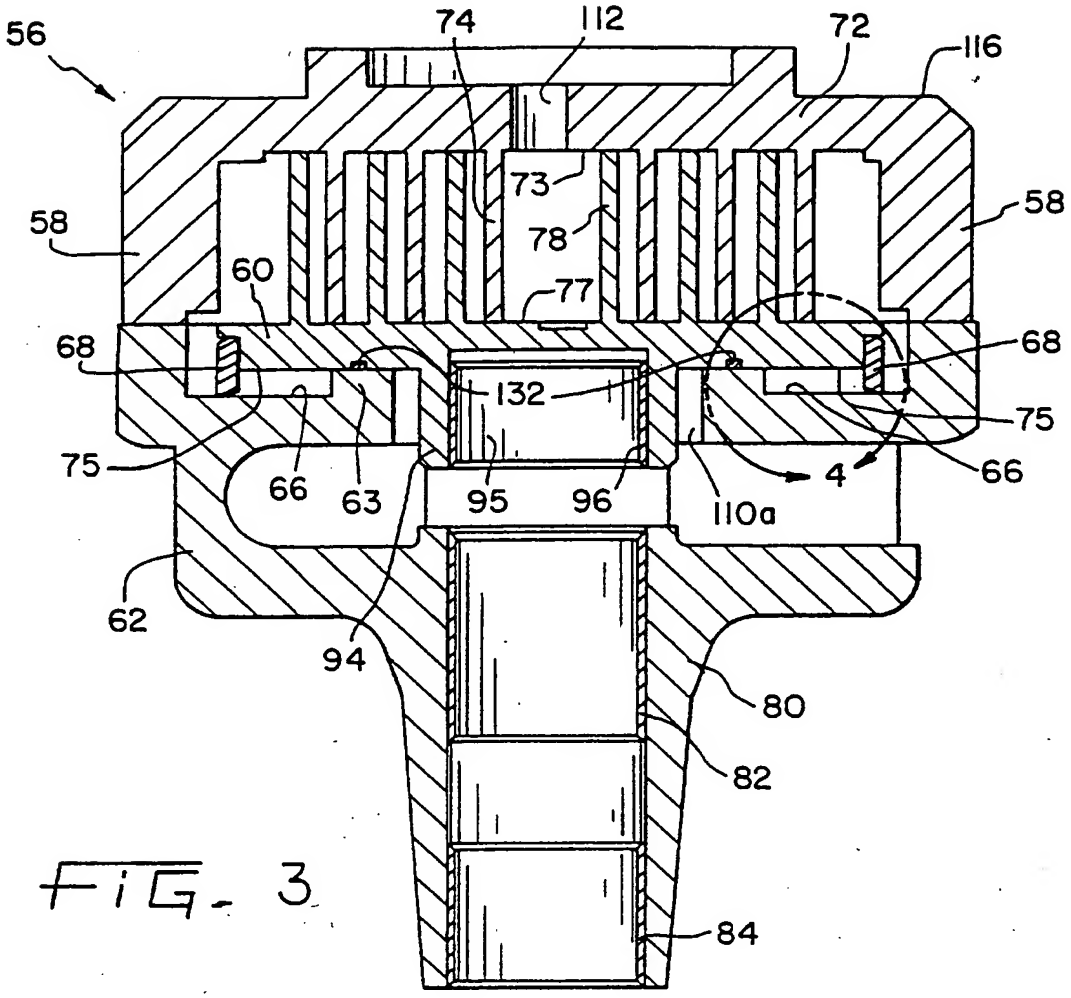
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FIG. 3

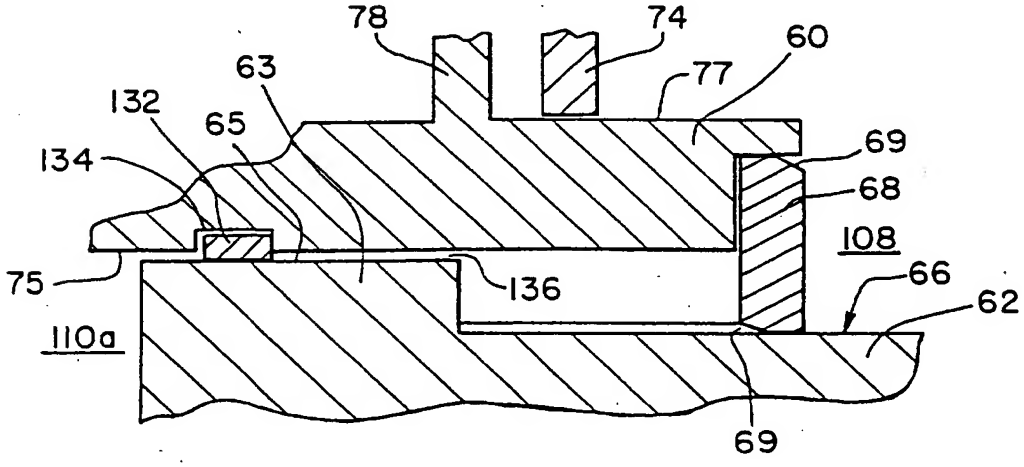
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FIG. 4

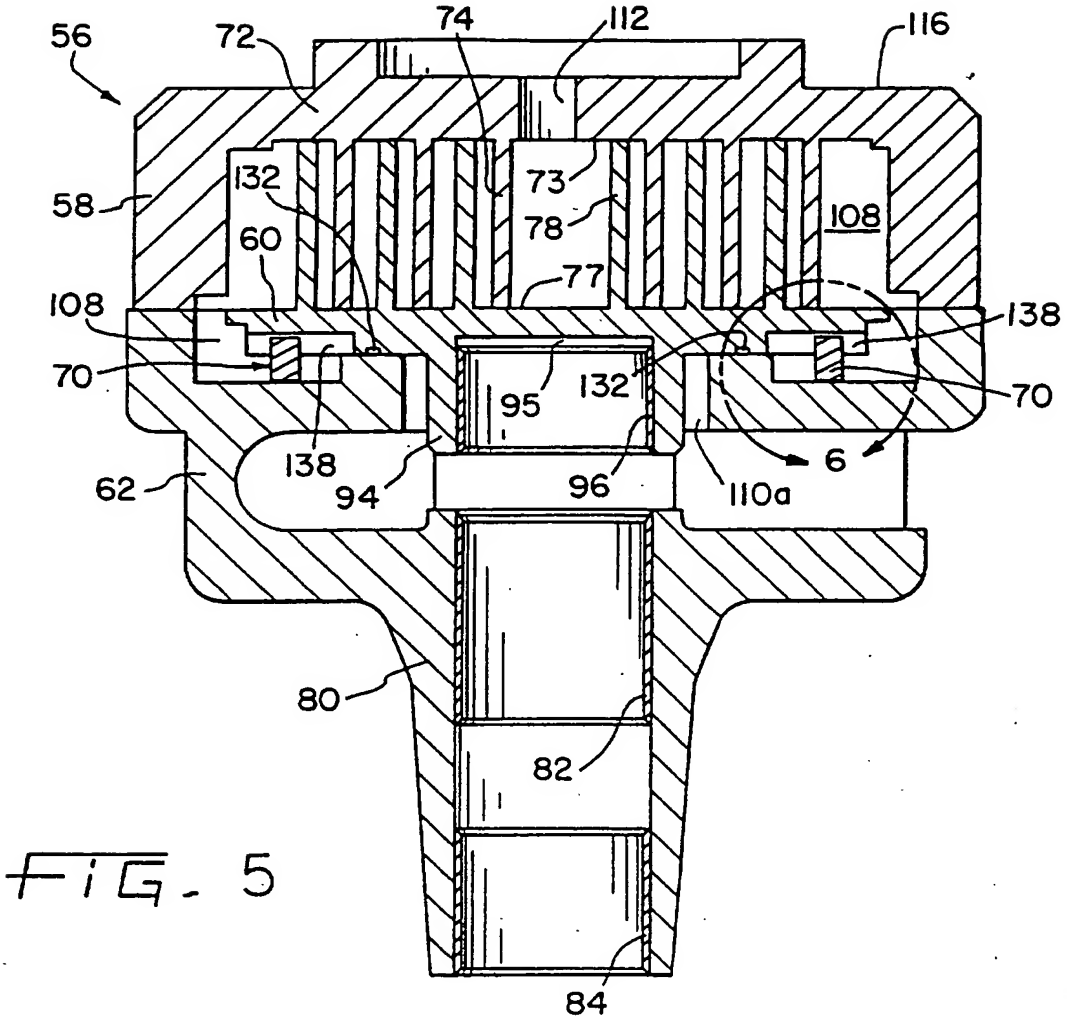
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FIG. 5

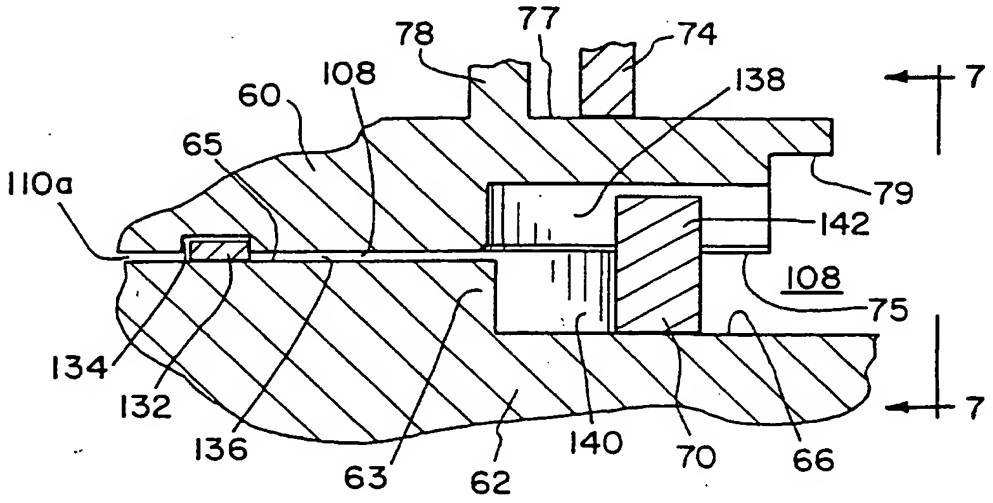
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FIG. 6

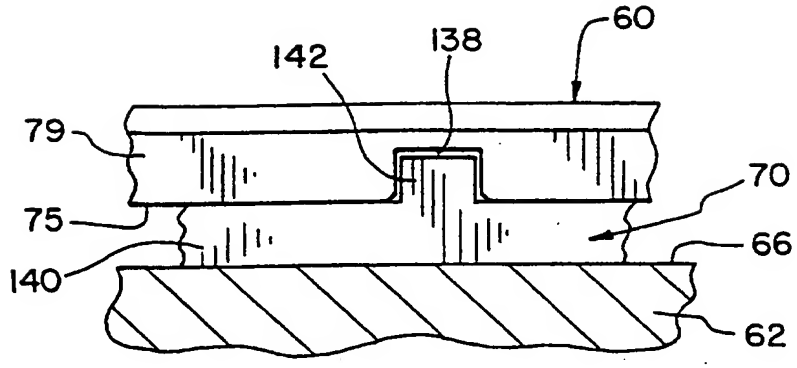
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FIG. 7

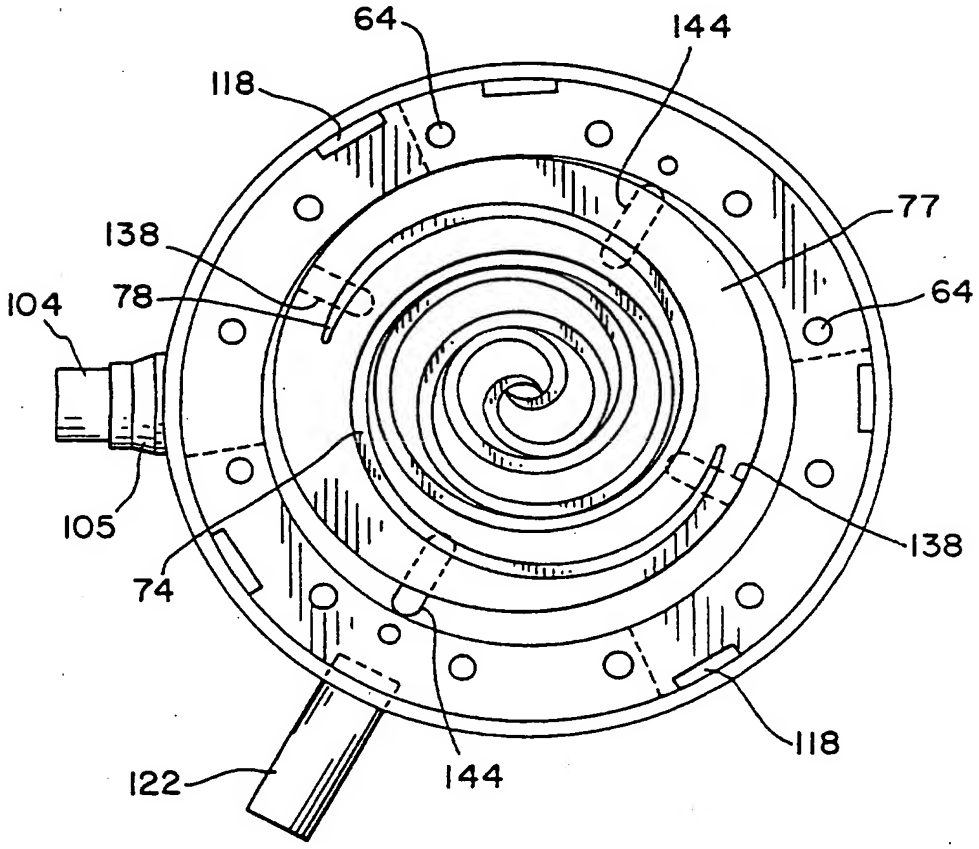
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FIG. 8